Amendments to the Claims

Per 37 C.F.R. §1.121(c), please amend the claims as provided in the attached claims listing in which deleted language is shown in strikethrough text and added language is underlined. As is required by 37 C.F.R. §1.121(c)(1), the claim listing begins on page 5 of this Reply.

Claims 1-2 and 12-16 have been withdrawn, 3, 6-8, and10 have been amended and claims 4, 5, 9 and 11 have been cancelled. The total number of currently pending claims is 9. No additional fee is required.

Per 37 C.F.R. §1.121(f), Applicant confirms that no new matter has been added to the claims.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims Listing

What is claimed is:

1. (Withdrawn) A method of analyzing a chemical analyte, said method comprising the steps of:

generating a fluctuation output signal in response to a plurality of frequency fluctuations in an oscillatory output signal of a SAW sensor, said fluctuations responsive to adsorption of molecules of said chemical analyte on a surface of said SAW sensor;

transforming said fluctuation output signal into an amplitude density signal, representative of the amplitude density of said frequency fluctuations; and

generating an analyte output signal representative of a total number n of said adsorbed molecules if said amplitude density signal corresponds to a theoretical amplitude density function P(r,n).

2. (Withdrawn) The method as in claim 1, wherein said theoretical amplitude density function P(r,n) is substantially represented by the equation:

$P(r,n) = \frac{n!}{r!(n-r)!} \cdot p^{r} \cdot (1-p)^{n-r}$, where n and r are nonnegative integers, $r \leq n$, n represents a theoretical total number of molecules on a surface of a virtual SAW sensor, r represents a theoretical number of molecules on an active zone of said virtual

SAW sensor, and where p is substantially represented by: $p = \frac{\mu_{\text{active}}}{\mu_{\text{total}}}$, where μ_{total} is the total area of said surface and μ_{active} is the area of said active zone.

3. (Currently amended) A chemical sensor system comprising:

a ~~chemical~~ surface acoustic wave (SAW) sensor that produces an oscillatory output signal responsive to adsorption of molecules of a chemical analyte by a primary surface of said sensor comprising at least one active zone;

~~measurement means for~~ said surface acoustic wave sensor measuring a plurality of frequency fluctuations of said oscillatory output signal;

amplitude density means, coupled to said measurement means, for generating an amplitude density signal representative of the amplitude density of said plurality of frequency fluctuations; and

~~decision means, coupled to said~~ a pattern recognizer receiving amplitude density ~~means~~ input, for generating an analyte output signal representative of a total number n of said adsorbed molecules if said amplitude density signal corresponds to a theoretical amplitude density function P(r,n) which is substantially represented by the equation: $P(r,n) = \frac{n!}{r!(n-r)!} \cdot p^r \cdot (1-p)^{n-r}$,

where n and r are nonnegative integers, $r \leq n$, n represents a theoretical total number of molecules on a surface of a virtual SAW sensor, r represents a theoretical number of molecules on an active zone of said virtual SAW

sensor, and where p is substantially represented by: $p = \frac{\mu_{\text{active}}}{\mu_{\text{total}}}$, where μ_{total} is the total area of said surface and μ_{active} is the area of said active zone function P(r,n), wherein said active zone is the area between at least two electrodes on said SAW device and is used to measure an output signal and wherein said total area of said surface is the total area of said SAW device over which an acoustic wave is generated.

4. (Cancelled).

5. (Cancelled).

6. (Currently amended) The chemical sensor system as in claim ~~5~~ 3, wherein said primary surface comprises a diffusion barrier that restricts diffusion of said chemical analyte to said primary surface.

7. (Currently amended) The chemical sensor system as in claim ~~5~~ 3, wherein said primary surface comprises at least one passive zone.

8. (Currently amended) The chemical sensor system as in claim [[4]] 3, wherein said chemical sensor further comprises a bandpass filter for selecting a single oscillatory mode.

9. (Cancelled).

10. (Currently amended) The chemical sensor system as in claim ~~9~~ 3, wherein said amplitude density means comprises means for generating an amplitude density histogram of a measured time series of an output of said frequency fluctuation counter.

11. (Cancelled)

12. (Withdrawn) A computer program product for use with a chemical sensor system including a chemical sensor arranged to produce an oscillatory output signal when exposed to a chemical analyte, said computer program product comprising:

a machine-readable recording medium;

a first instruction means, recorded on said recording medium, for directing said chemical sensor system to generate a fluctuation output signal in response to a plurality of frequency fluctuations in said oscillatory output signal, said fluctuations responsive to adsorption of molecules of said chemical analyte on a surface of said chemical sensor;

a second instruction means, recorded on said recording medium, for directing said chemical sensor system to generate an amplitude density signal representative of the amplitude density of said plurality of frequency fluctuations in response to said fluctuation output signal;

a third instruction means, recorded on said recording medium, for directing said chemical sensor system to generate an analyte output signal that identifies a total number n of said adsorbed molecules if said amplitude density signal corresponds to a theoretical amplitude density function P(r,n).

13. (Withdrawn) The computer program product as in claim 12, further comprising:

a fourth instruction means, recording on said recording medium, for directing said chemical sensor system to correlate patterns in said amplitude density signal to said theoretical amplitude density function.

14. (Withdrawn) The computer program product as in claim 12, wherein said theoretical amplitude density function P(r,n) is substantially represented by the equation:

$P(r,n) = \frac{n!}{r!(n-r)!} \cdot p^r \cdot (1-p)^{n-r}$, where n and r are nonnegative integers, $r \leq n$, n represents a theoretical total number of molecules on a surface of a virtual SAW sensor, r represents a theoretical number of molecules on an active zone of said virtual SAW sensor, and where p is substantially represented by: $p = \frac{\mu_{active}}{\mu_{total}}$, where μ_{total} is the total area of said surface and μ_{active} is the area of said active zone.

15. (Withdrawn) A method of analyzing a chemical analyte, said method comprising the steps of:

generating a surface acoustic wave across a surface of a structure;

transducing said surface acoustic wave into an oscillatory output signal;

generating a fluctuation output signal in response to a plurality of frequency fluctuations in said oscillatory output signal, said fluctuations responsive to adsorption of molecules of said chemical analyte on said surface;

generating an amplitude density histogram in response to said fluctuation output signal; and

generating an analyte output signal that identifies a total number n of said adsorbed molecules if said amplitude density histogram corresponds to a known amplitude density histogram.

16. (Withdrawn) The method as in claim 15, wherein said known amplitude density histogram is substantially represented by the equation: $P(r,n) = \frac{n!}{r!(n-r)!} \cdot p^r \cdot (1-p)^{n-r}$, where n and r are nonnegative integers, $r \le n$, n represents a theoretical total number of molecules on a surface of a virtual SAW sensor, r represents a theoretical number of molecules on an active zone of said virtual SAW sensor, and where p is substantially represented by: $p = \frac{\mu_{\text{active}}}{\mu_{\text{total}}}$, where μ_{total} is the total area of said surface and μ_{active} is the area of said active zone.